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Varian Inc.
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EXAMINER	
LARKIN, DANIEL SEAN	
ART UNIT	**PAPER NUMBER**
2856	

DATE MAILED: 04/13/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/524,284	PERKINS ET AL.	
	Examiner	Art Unit	
	Daniel S. Larkin	2856	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-22* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-5,7-11,13,14 and 16-22* is/are rejected.

7)☒ Claim(s) *6,12 and 15* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *10 February 2005* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *10 February 2005*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. The drawings are objected to under 37 CFR 1.83(a) because they fail to show the structure of Figure 2A as described in the specification. Any structural detail that is essential for a proper understanding of the disclosed invention should be shown in the drawing. MPEP § 608.02(d).

2. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the "heating element in thermal contact with the quartz member", as recited in claim 4, must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

3. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing

date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

4. The disclosure is objected to because of the following informalities:

Page 5, line 3: The term "vacuum pump" should be corrected to read -- turbopump --.

Page 6, line 2: A -- comma -- should be inserted prior to the term "such".

Page 6, line 2: The term "Teflon" should be corrected to read --TEFLON -- since all trademarks that appear within the application should be capitalized. Appropriate correction is required.

Claim Objections

5. Claims 11, 12, and 15 are objected to because of the following informalities:

Re claim 11, claim line 1: The article "a" prior to the term "second" should be corrected to read --the -- or -- said --.

Re claim 11, claim line 2: The article "a" prior to the term "vacuum" should be corrected to read --the -- or -- said --.

Re claim 12, claim line 1: The article "a" prior to the term "first" should be corrected to read --the -- or -- said --.

Re claim 12, claim line 2: The article "a" prior to the term "trace" should be corrected to read --the -- or -- said --.

Re claim 15, claim line 2: The article "a" prior to the term "trace" should be corrected to read --the -- or -- said --.

Re claim 15, claim line 4: The article "a" prior to the terms "second" and "vacuum" should be corrected to read --the -- or -- said --. Appropriate correction is required.

Claim Rejections - 35 USC § 112

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claims 2 and 13 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

With respect to the limitation of claim 2, it is not clear if applicant is claiming an apparatus or a process. Specifically, claim 2 is depended from apparatus claim 1; however, the claim is reciting process methodology without providing any structural recitations. Additionally, it is not clear how the valve is closed during high pressure testing and open during low pressure testing without reciting any structure for opening and closing the valve.

With respect to the limitation of claim 13, the claim is recited in such a way as to suggest that the phrase "controlling the permeable member" has been previously

recited, which is not the case. Therefore, the examiner deems the phrase "controlling the permeable member" to lack antecedent basis.

Claim Rejections - 35 USC § 102

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

9. Claims 1, 2, 9-11, 14, 16, and 18 are rejected under 35 U.S.C. 102(b) as being anticipated by US 6,014,892 (Baret et al.).

With respect to the limitations of claim 1, the reference to Baret et al. discloses a tracer gas leak detector, comprising: a test line (7) configured to receive a sample containing a trace gas; a mass spectrometer (1) configured to detect the trace gas and having an inlet for receiving the trace gas; a first vacuum pump (2) characterized by a relatively high reverse flow rate for light gases and a relatively low reverse flow rate for heavy gases, said first vacuum pump having a pump inlet and a foreline (4), the pump inlet being coupled to the inlet of said mass spectrometer (1); a foreline valve (5) coupled between the foreline (4) of said first vacuum pump (2) and the test line (7); a trace gas permeable member (11) coupled between the test line (7) and the inlet of said mass spectrometer (1), the trace gas permeable member allowing the trace gas to pass and blocking other gases, liquids and particles, col. 3, lines 24-27; and a second vacuum pump (3) having an inlet coupled to the test line (7).

With respect to the limitations of claim 2, the reference to Baret et al. discloses that the in the event a large leak is to be measured the foreline valve (5) is closed, col. 3, lines 37-39. If it is determined that the leak is not too large, the pressure within the test line decreases and the foreline valve (5) is opened to enable a countercurrent measurement to be performed, col. 3, lines 41-46.

With respect to the limitation of claim 9, the reference to Baret et al. discloses that the first vacuum pump is a hybrid molecular drag pump.

With respect to the limitations of claim 10, the reference to Baret et al. discloses a method of tracer gas leak detection, comprising the steps of: pumping gas from a test volume through a test line (7) at relatively high pressures in the test line, passing a first portion of the pumped gas through a trace gas permeable member (11) to a mass spectrometer (1), the trace gas permeable member allowing the trace gas to pass and blocking other gases, liquids and particles, col. 3, lines 24-27; and at relatively low pressures in the test line, passing a second portion of the pumped gas in reverse direction through a vacuum pump (2) to the mass spectrometer (1), the vacuum pump (1) characterized by a relatively high reverse flow rate for light gases and a relatively low reverse flow rate for heavy gases.

With respect to the limitations of claim 11, the reference to Baret et al. discloses that the leak detection process additionally comprises providing a foreline valve (5) coupled between a foreline (4) of the vacuum pump (2) and the test line (7). Additionally, the reference discloses that in the event a large leak is to be measured, the foreline valve (5) is closed, col. 3, lines 37-39. If it is determined that the leak is not too

large, the pressure within the test line decreases and the foreline valve (5) is opened to enable a countercurrent measurement to be performed, col. 3, lines 41-46.

With respect to the limitation of claim 14, the reference to Baret et al. discloses that in the event a large leak is to be measured, the foreline valve (5) is closed and the presence of a tracer gas in the pumped flow is measured by the spectrometer (1) through the permeable member, col. 3, lines 37-41.

With respect to the limitations of claim 16, the reference to Baret et al. discloses a tracer gas leak detector, comprising: a test line (7) configured to receive a sample containing a trace gas; a mass spectrometer (1) configured to detect the trace gas and having an inlet for receiving the trace gas; a first vacuum pump (2) characterized by a relatively high reverse flow rate for light gases and a relatively low reverse flow rate for heavy gases, said first vacuum pump having a pump inlet and a foreline (4), the pump inlet being coupled to the inlet of said mass spectrometer (1); a second vacuum pump (3) configured to back the first vacuum pump (2); and a trace gas permeable member (11) coupled between the test line (7) and the inlet of said mass spectrometer (1), the trace gas permeable member allowing the trace gas to pass and blocking other gases, liquids and particles, col. 3, lines 24-27; and a second vacuum pump (3) having an inlet coupled to the test line (7).

With respect to the limitation of claim 18, the reference to Baret et al. further discloses a bypass valve (10) coupled in parallel with the trace gas permeable member (11).

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

11. Claims 3-5 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 6,014,892 (Baret et al.) in view of US 5,661,229 (Bohm et al.)

With respect to the limitations of claims 3-5 and 13, the reference to Baret et al. discloses all of the limitations of the base claim; however, the reference to Baret et al. fails to disclose that the trace permeable member is made of quartz (claim 3); a heating element is in thermal contact with the quartz (claim 4); or that the permeability of the trace gas permeable member is controllable (claims 5 and 13).

The reference to Bohm et al. discloses a test gas detector, comprising a test line (2); a gas detector (8); a first vacuum pump (17) having a pump inlet coupled to the gas detector (8); a second vacuum pump (4) having an inlet coupled to the test line (2); and a trace gas permeable member (7) comprised of quartz and having a heating element (16) in thermal contact with the quartz member (7). The reference additionally discloses means for controlling the heating element such that the permeability of the trace gas permeable member (6) is controllable, col. 2, lines 10-13 and 24-28. Replacing the permeable member of Baret et al. with a material whose permeability may be controlled, such as quartz, would have been obvious to one of ordinary skill in the art as a means of avoiding the entry of too much helium into the detection system. This allows the

detection mechanism to have a short recovery time and thus allow for a quick turn around for increased sampling.

12. Claims 7, 17, 20, and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 6,014,892 (Baret et al.) in view of US 4,773,256 (Saulgeot).

With respect to the limitation of claim 7, the reference to Baret et al. discloses all of the limitations of the base claim; however, the reference to Baret et al. fails to disclose that the first pump (2) is a turbomolecular pump.

The reference to Saulgeot discloses an apparatus for detecting a leak of tracer gas, comprising: a part under test (9); a test line (13) configured to receive a sample containing a trace gas; a mass spectrometer (1) configured to detect the trace gas and having an inlet for receiving the trace gas; a first turbomolecular pump (7) characterized by a relatively high reverse flow rate for light gases and a relatively low reverse flow rate for heavy gases, said first turbomolecular pump (7) having a pump inlet and a foreline (14), the pump inlet being coupled to the inlet of said mass spectrometer (1); and a second vacuum pump (5) having an inlet coupled to the test line (13). Modifying the vacuum pump of Baret et al. to provide a turbomolecular pump would have been obvious to one of ordinary skill in the art because a turbomolecular pump has the ability to pump to very low pressures quickly and this advantage allows for faster testing times.

With respect to the limitation of claim 17, the reference to Baret et al. discloses all of the limitations of the base claim; however, the reference to Baret et al. fails to disclose that the first pump (2) is a turbomolecular pump.

The reference to Saulgeot discloses an apparatus for detecting a leak of tracer gas, comprising: a part under test (9); a test line (13) configured to receive a sample containing a trace gas; a mass spectrometer (1) configured to detect the trace gas and having an inlet for receiving the trace gas; a first turbomolecular pump (7) characterized by a relatively high reverse flow rate for light gases and a relatively low reverse flow rate for heavy gases, said first turbomolecular pump (7) having a pump inlet and a foreline (14), the pump inlet being coupled to the inlet of said mass spectrometer (1); and a second vacuum pump (5) configured to back the turbomolecular pump (7). Modifying the vacuum pump of Baret et al. to provide a turbomolecular pump would have been obvious to one of ordinary skill in the art because a turbomolecular pump has the ability to pump to very low pressures quickly and this advantage allows for faster testing times.

With respect to the limitation of claim 20, the reference to Baret et al. discloses a tracer gas leak detector, comprising: a test line (7) configured to receive a sample containing a trace gas; a mass spectrometer (1) configured to detect the trace gas and having an inlet for receiving the trace gas; a first vacuum pump (2) having a pump inlet and a foreline (4), the pump inlet being coupled to the inlet of said mass spectrometer (1); a second vacuum pump/forepump (3) configured to back the first vacuum pump (2); and a trace gas permeable member (11) coupled between the test line (7) and the inlet of said mass spectrometer (1), the trace gas permeable member allowing the trace gas to pass and blocking other gases, liquids and particles, col. 3, lines 24-27; and a second vacuum pump (3) having an inlet coupled to the test line (7). The reference to Baret et

al. fails to disclose that the first pump (2) is a turbomolecular pump having a pump inlet, a midstage line, and a foreline.

The reference to Saulgeot discloses an apparatus for detecting a leak of tracer gas, comprising: a part under test (9); a test line (13) configured to receive a sample containing a trace gas; a mass spectrometer (1) configured to detect the trace gas and having an inlet for receiving the trace gas; a turbomolecular vacuum pump (7) having a pump inlet, a midstage line (11), and a foreline (14), the pump inlet being coupled to the inlet of said mass spectrometer (1); and a second vacuum pump/forepump (5) configured to back the turbomolecular pump (7). Modifying the vacuum pump of Baret et al. to provide a turbomolecular pump would have been obvious to one of ordinary skill in the art because a turbomolecular pump has the ability to pump to very low pressures quickly and this advantage allows for faster testing times.

With respect to the limitation of claim 21, the reference to Baret et al. further discloses a bypass valve (10) coupled in parallel with the trace gas permeable member (11).

13. Claims 8 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 6,014,892 (Baret et al.) in view of US 5,625,141 (Mahoney et al.).

With respect to the limitation of claim 8, the reference to Baret et al. discloses all of the limitations of the base claim; however, the reference to Baret et al. fails to disclose that the first vacuum pump comprises a diffusion pump.

The reference Mahoney et al. discloses a leak testing apparatus, comprising a test line configured to receive a sample (16) containing a trace gas; a spectrometer tube (60) configured to detect the trace gas and having an inlet for receiving the trace gas; a first vacuum pump (54) characterized by a relatively high reverse flow rate for light gases and a relatively low reverse flow rate for heavy gases, said first vacuum pump having a pump inlet and a foreline (52), the pump inlet (58) being coupled to the inlet of the spectrometer tube (60); and a second vacuum pump (56) having an inlet coupled to the test line (7). The reference to Mahoney et al. further discloses that the first vacuum pump (54) comprises a diffusion pump.

Modifying the first vacuum pump of Baret et al. with a diffusion pump would have been obvious to one of ordinary skill in the art given that many pumps, such as diffusion pumps, turbomolecular pumps, and hybrid vacuum pumps, are interchangeable such that one of ordinary skill in the art would recognize the advantages and disadvantages of using one pump over another for the specific application at hand.

With respect to the limitation of claim 19, the reference to Baret et al. discloses all of the limitations of the base claim; however, the reference to Baret et al. fails to disclose a roughing pump coupled to the test line.

The reference Mahoney et al. discloses a leak testing apparatus, comprising: a test line configured to receive a sample (16) containing a trace gas; a spectrometer tube (60) configured to detect the trace gas and having an inlet for receiving the trace gas; a first vacuum pump (54) characterized by a relatively high reverse flow rate for light gases and a relatively low reverse flow rate for heavy gases, said first vacuum pump

having a pump inlet and a foreline (52), the pump inlet (58) being coupled to the inlet of the spectrometer tube (60); and a second vacuum pump (56) configured to back the first vacuum pump (54). The reference to Mahoney et al. further discloses the addition of a roughing pump (42) coupled to the test line.

Modifying the leak testing apparatus of Baret et al. to include a roughing pump would have been obvious to one of ordinary skill in the art as a means of quickly evacuating the part under test such that a rough leak test can be performed on the pump without having to perform a longer evacuation test which would be required to look for medium and small leaks within the part.

14. Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over US 6,014,892 (Baret et al.) in view of US 4,773,256 (Saulgeot) as applied to claim 20 above, and further in view of US 5,625,141 (Mahoney et al.).

With respect to the limitation of claim 22, the reference to Baret et al. discloses all of the limitations of the base claim; however, the references to Baret et al. and Saulgeot both fail to disclose a roughing pump coupled to the test line.

The reference Mahoney et al. discloses a leak testing apparatus, comprising: a test line configured to receive a sample (16) containing a trace gas; a spectrometer tube (60) configured to detect the trace gas and having an inlet for receiving the trace gas; a turbomolecular vacuum pump (54) having a pump inlet and a foreline (52), the pump inlet (58) being coupled to the inlet of the spectrometer tube (60); and a forepump (56)

configured to back the turbomolecular vacuum pump (54). The reference to Mahoney et al. further discloses the addition of a roughing pump (42) coupled to the test line.

Modifying the leak testing apparatus of Baret et al. in view of Saulgeot to include a roughing pump would have been obvious to one of ordinary skill in the art as a means of quickly evacuating the part under test such that a rough leak test can be performed on the pump without having to perform a longer evacuation test which would be required to look for medium and small leaks within the part.

Allowable Subject Matter

15. The following is a statement of reasons for the indication of allowable subject matter:

Prior art was not relied upon to reject claims 6, 12, and 15 because the prior art fail to teach and/or make obvious the following limitations:

Claim 6: Providing an apparatus for leak detection, comprising a permeable member which is controllable; and a controller configured to increase the trace gas permeability of the permeable member and to close a foreline valve at relatively high pressures in a test line and configured to decrease the trace gas permeability of the permeable member and to open the foreline valve at relatively low pressures in the test line in combination with all of the limitations of base claim 1.

Claim 12: Providing a method for leak detection, comprising: passing a first portion of a pumped gas through a trace gas permeable member; and controlling the permeable member between high trace gas permeability at relatively high pressures in

a test line and low trace gas permeability at relatively low pressures in the test line in combination with all of the limitations of base claim 10.

Claim 15: Providing a method for leak detection, comprising: passing a first portion of a pumped gas through a trace gas permeable member by increasing the permeability of the permeable member and closing a foreline valve coupled between a foreline of the vacuum pump and the test line, and passing a second portion of the pumped gas in reverse direction through a vacuum pump comprises decreasing the permeability of the permeable member and opening the foreline valve in combination with all of the limitations of base claim 10.

Conclusion

16. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

The prior art to US 5,193,380 (Tallon) discloses a high-flow-rate leak detector having a first turbomolecular pump (T), a primary pump (P1); and a helium permeable member (F3).

The prior art to US 4,779,449 (Bley et al.) disclose a leak detector comprising a turbomolecular pump (11), a mass spectrometer (14); and first and second roughing pumps (19, 26).

The prior art to US 3,690,151 (Briggs) discloses a leak detector comprising a mass spectrometer (MS) a high vacuum pump (HVP), such as a diffusion pump, a forepump (FP), and a roughing pump (RP), as shown in Figure 4.

17. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Daniel S. Larkin whose telephone number is 571-272-2198. The examiner can normally be reached on 8:00 AM - 5:00 PM Mon-Fri.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hezron Williams can be reached on 571-272-2208. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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05 April 2006